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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Atty. Docket: P/7209  
Lev Uryevich ROBERTS-HARITONOV et al. : Group Art Unit: 3673  
Serial No. 10/804,870 : Confirmation No. 7646  
Filed: March 19, 2004 :  
For: MODULAR GAS SEALS CARTRIDGE :

**CLAIM FOR PRIORITY UNDER 35 USC §119**

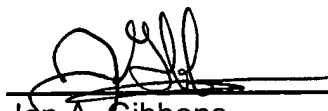
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

SIR:

Under the provisions of 35 USC §119, there is filed herewith a certified copies of United Kingdom Application No. 0306402.9 filed on March 20, 2003 and United Kingdom Application No. 0327671.4 filed on November 28, 2003, in accordance with the International Convention for the Protection of Industrial Property, 53 Stat. 1748, under which Applicants hereby claim priority.

Respectfully submitted,

Date: 3/27/06

By:   
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INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

## CERTIFIED COPY OF PRIORITY DOCUMENT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

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Signed

*H. Behen*

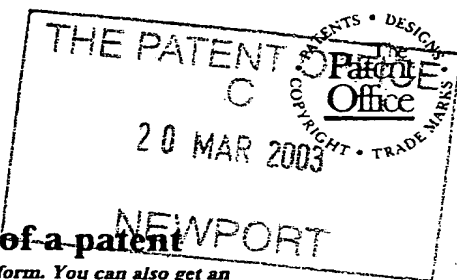
Dated 3 September 2004

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Patent 1977  
(Rule 1)



1/77

20MAR03 ET93826-4 D01607  
P01/7700 0.00-0306402.9  
The Patent Office

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

Cardiff Road  
Newport  
South Wales  
NP10 8QQ

1. Your reference

P/7003

2. Patent application number

(The Patent Office will fill in this part)

0306402.9

20 MAR 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Corac Group PLC  
Brunel Science park  
Kingston Lane  
Uxbridge  
Middlesex UB8 3PQ

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

8137085001

4. Title of the invention

Modular Gas Seals Cartridge

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

A. Messulam & Co. Ltd.  
43-45 High Road  
Bushey Heath  
Bushey  
HERTS WD23 1EE

Patents ADP number (if you know it)

07636210001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

## Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

None

Description

3

Claim(s)

Abstract

Drawing(s)

24

10. If you are also filing any of the following, state how many against each item.

Priority documents

N/A

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

No

Request for substantive examination (Patents Form 10/77)

No

Any other documents  
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

*A. Messulam*

Date

18 March, 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

A. Messulam (020 8421 8197)

### Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

### Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
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- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
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## Modular gas seals cartridge

### Background to the Invention

Gas seals are now used widely to seal process gases in large turbo compressors and associated turbo machinery. The industry has adopted as its standard, the cartridge arrangement containing the complete seal arrangement within its assembly.

The most common type of gas seal is a tandem seal. It is made up of two stages, the inboard stage (IB) and the outboard stage (OB). The IB stage is used to seal the complete process gas pressure. The OB stage is also engineered to seal the complete process gas pressure. However, during normal running, it sees no more than a few bar of gas pressure. It's main function is to act as a back up to the IB stage. Should the IB stage suffer catastrophic failure during operation, the OB stage takes on the full sealing duty. This enables the compressor to be run down, stopped and process gas pressure vented in a controlled manner.

The industry had accepted the tandem seal arrangement as the standard. All the tandem seals follow the same assembly configuration detailed below.

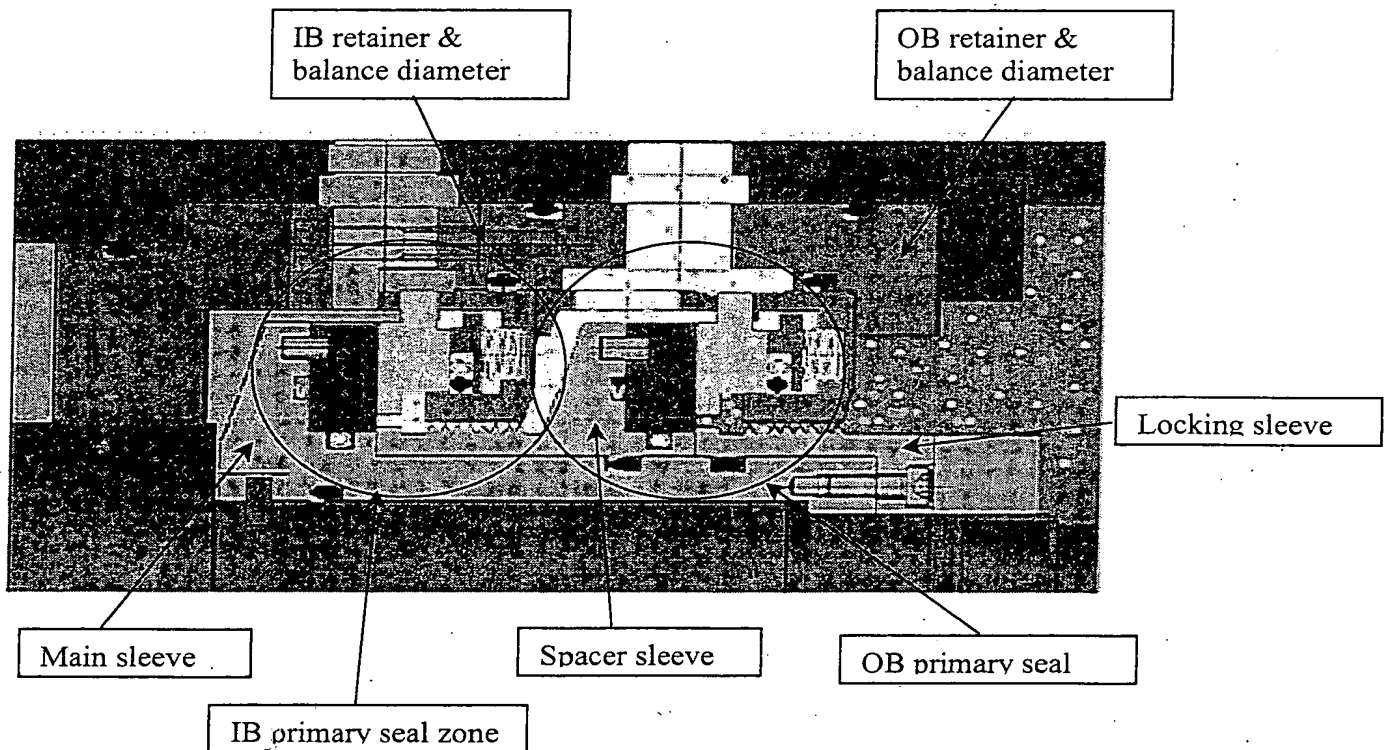


Figure 1. Typical tandem seal arrangement

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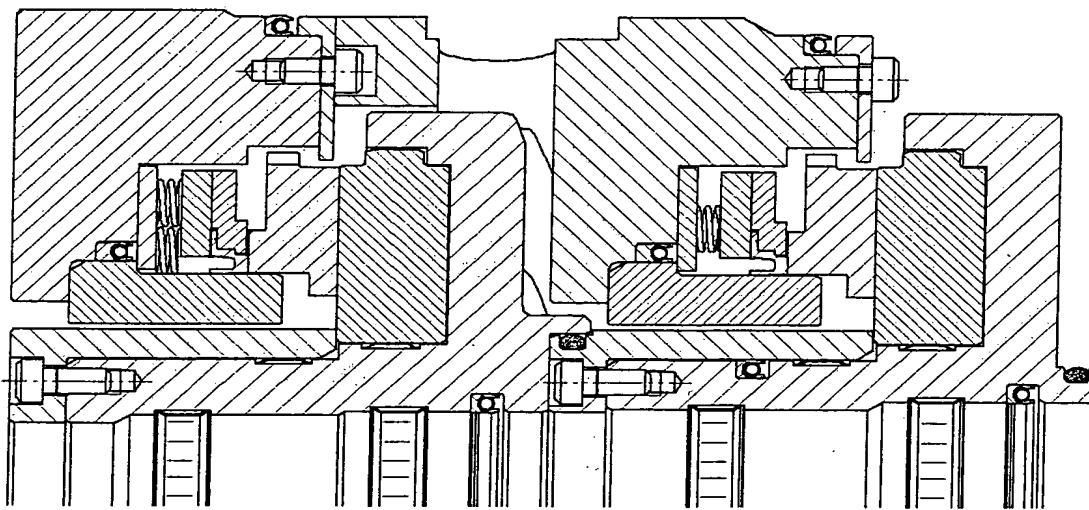
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The key components of the tandem seal have been identified in figure 1. The main feature of the conventional arrangement is that the two stages share common parts (such as the spacer sleeve). This means that the two stages (IB & OB), cannot be separated while still remain as self-contained functioning units.

### **Description of the Invention**

The invention relates to the modular arrangement of the tandem gas seal configuration. In this invention, the IB & OB stages have been completely split into two separate and independent modules. One separate module comprises of the IB stage cartridge, and the other module is the OB stage cartridge. The two modules are completely separate and independent of each other, having no common components. The resultant benefits are presented in the next section.



**Figure 2. Modular tandem gas seal cartridge arrangement of the invention.**

### **Benefits of the Invention**

- The modular arrangement, enables independent replacement of just one cartridge module, be it the IB or the OB stage. This can significantly reduce down time.
- Any refurbishment, repair, or replacement need only be done on one stage module, without having to strip the other one.
  - This further reduces turn around time and costs.

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- Reduced manufacturing costs.
  - Less metal is required to be removed to produce above components compared with a conventional tandem seal cartridge.
- Significantly simpler assembly procedure, resulting in reduced assembly time and reduced assembly costs.
- The modular arrangement enables much more rapid fault diagnosis on test, thus further reducing time and costs.
- Simplified strip down and evaluation procedures.

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